

CLAIMS

What is claimed is:

1. A method of surface-mounting semiconductor chips on a PCB, including mounting a flip chip type semiconductor chip on the PCB mounted with electronic components, comprising:
 - forming a solder bump on a conductive contact area of each semiconductor chip on a back of a semiconductor wafer mounted with a plurality of semiconductor chips;
 - injecting underfill material on the area of the semiconductor wafer formed with the solder bump;
 - hardening the underfill material partially to have a cohesive property;
 - severing the semiconductor wafer into the plurality of the semiconductor chips;
 - arranging the severed semiconductor chips having the hardened underfill material on the PCB; and
 - heating the PCB at a predetermined temperature.
2. The surface-mounting method of the semiconductor chip on the PCB according to claim 1, wherein the predetermined heating temperature is above the temperature of a melting point of the solder bump.
3. The surface-mounting method of the semiconductor chip on the PCB according to claim 2, wherein the underfill material is solidified during the heating.
4. A process of preparing a wafer to be used for surface mounting a semiconductor chip on a PCB comprising:
 - forming a plurality of solder balls on a surface of a semiconductor wafer;
 - coating the surface of the semiconductor wafer formed with the solder balls with underfill material;
 - curing the underfill material to achieve a semisolid state.

5. The process of preparing a wafer to be used for surface mounting a semiconductor chip on a PCB as in claim 4, wherein a temperature to cure the underfill material to a semisolid state is lower than a reflow temperature of the solder balls.

6. The process of preparing a wafer to be used for surface mounting a semiconductor chip on a PCB as in claim 5, further comprising:

severing the semiconductor wafer into a plurality of semiconductor chips;
arranging the plurality of semiconductor chips on the PCB; and
raising the temperature of the PCB to a predetermined temperature.

7. The process of preparing a wafer to be used for surface mounting a semiconductor chip on a PCB as in claim 6, wherein the predetermined temperature is above the reflow temperature of the solder balls.

8. The process of preparing a wafer to be used for surface mounting a semiconductor chip on a PCB as in claim 7, wherein the underfill is cured to a solid state at the predetermined temperature.

9. The process of preparing a wafer to be used for surface mounting a semiconductor chip on a PCB as in claim 4, wherein the height of the underfill coating is approximately equal to the height of the solder balls.

10. The process of preparing a wafer to be used for surface mounting a semiconductor chip on a PCB as in claim 4, wherein the height of the underfill coating is above the height of the solder balls.

11. A process of surface mounting flip chip type semiconductor chips on a PCB comprising:
forming a plurality of solder bumps on a surface of a flip chip type semiconductor wafer;
injecting the surface of the flip chip type semiconductor wafer formed with solder bumps with underfill material to a height approximately equal to the solder bumps;
curing the underfill material to achieve a semisolid state;

severing the flip chip type semiconductor wafer into a plurality of flip chip semiconductor chips;
arranging the plurality of flip chip semiconductor chips on the PCB; and
raising the temperature of the PCB to a predetermined temperature.

12. The process as in claim 11, wherein the predetermined temperature is above a temperature that the solder bumps reflow.

13. The process as in claim 12, wherein the underfill is cured to a solid state at the predetermined temperature.

14. The process as in claim 11, further comprising operably arranging a plurality of electronic components on the PCB with at least one flip chip semiconductor chip before raising the temperature of the PCB to the predetermined temperature.